

CONNECTICUT RIVER BASIN
NEWINGTON CONNECTICUT

MILL POND DAM CT 00164

INSPECTION REPORT

The original hardcopy version of this report
contains color photographs and/or drawings.
For additional information on this report
please email



U.S. Army Corps of Engineers
New England District
Email: Library@nae02.usace.army.mil

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

MAY 1981

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00164	2. GOVT ACCESSION NO. ADA143453	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Mill Pond Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
12. REPORT DATE May 1981		13. NUMBER OF PAGES 50
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
16. DISTRIBUTION STATEMENT (of this Report) APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Conn. River Basin Newington, Conn. Mill Pond Dam		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Mill Pond Dam is an earth covered, irregular natural rock formation 600 ft. long, with a top width varying from 10 to 20 ft. and a maximum height of 19 ft. The Mill Pond Dam is judged to be in good condition; however, during the inspection there was a light snow cover of approx. 2" which may have obscured problems, such as erosion or seepage. The Mill Pond Dam is classified as 'small' in size with 'low' hazard potential.		

MILL POND DAM

CT 00164

CONNECTICUT RIVER BASIN

NEWINGTON, CONNECTICUT

INSPECTION REPORT

INSPECTION REPORT

IDENTIFICATION NO. CT-00164
NAME OF DAM: Mill Pond Dam
TOWN: Newington
COUNTY AND STATE: Hartford County, Connecticut
STREAM: Mill Brook
DATE OF INSPECTION: December 17, 1980

BRIEF ASSESSMENT

Mill Pond Dam is an earth covered, irregular natural rock formation 600 ft. long, with a top width varying from 10 to 20 ft. and a maximum height of 19 ft. The outlet for the dam is a natural rock weir spillway approximately 35 ft. wide, which is overpassed by a footbridge. The crest of the spillway is about 3 ft. below the lowest point on the dam crest.

Based on visual inspection, the Mill Pond Dam is judged to be in good condition; however, during the inspection, there was a light snow cover of approximately 2" which may have obscured problems, such as erosion or seepage.

As per the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the Mill Pond Dam is classified as 'small' in size with 'low' hazard potential. A test flood of a 100 year frequency was selected in accordance with the Corps of Engineers' Guidelines. The calculated test flood inflow of 1,000 cfs results in a routed outflow of 990 cfs. With the water level at the top of

the dam the spillway capacity is 575 cfs which is 58% of the out-flow flood. The storage capacity of the Mill Pond is 52 ac. ft. at the top of the dam.

It is proposed that the remedial measures in Section 7 be carried out by the owner.

GOODKIND & O'DEA, INC.
AND
SINGHAL ASSOCIATES
(J.V.)

R. Singhal

Ramesh Singhal, PH.D., P.E.
(Singhal Associates)



Lawrence J. Buckley

Lawrence J. Buckley, P.E.
(Goodkind & O'Dea, Inc.)

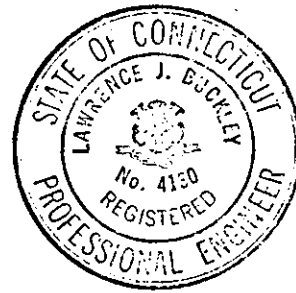


TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE NO.</u>
LETTER OF TRANSMITTAL	
BRIEF ASSESSMENT	
REVIEW BOARD PAGE	
TABLE OF CONTENTS	i
OVERVIEW PHOTO	Sheet 1
LOCATION PLAN	Sheet 2

REPORT

1. PROJECT INFORMATION	
1.1 <u>General</u>	1-1
a. Authority	
b. Purpose of Inspection	
1.2 <u>Description of Project</u>	1-2
a. Location	
b. Description of Dam & Appurtenances	
c. Size Classification	
d. Hazard Classification	
e. Ownership	
f. Operator	
g. Purpose of Dam	
h. Design & Construction History	
i. Normal Operational Procedure	
1.3 <u>Pertinent Data</u>	1-5
a. Drainage Area	
b. Discharge at Damsite	
c. Elevation	
d. Reservoir Length	
e. Storage	
f. Reservoir Surface	
g. Dam	
h. Diversion & Regulating Tunnel	
i. Spillway	
j. Regulating Outlets	

<u>SECTION</u>	<u>PAGE NO.</u>
2. ENGINEERING DATA	
2.1 <u>Design Data</u>	2-1
2.2 <u>Construction Data</u>	2-1
2.3 <u>Operation Data</u>	2-1
2.4 <u>Evaluation of Data</u>	2-1
a. Availability	
b. Adequacy	
c. Validity	
3. VISUAL INSPECTION	
3.1 <u>Findings</u>	3-1
a. General	
b. Dam	
c. Appurtenant Structures	
d. Reservoir Area	
e. Downstream Channel	
3.2 <u>Evaluation</u>	3-4
4. OPERATIONAL & MAINTENANCE PROCEDURES	
4.1 <u>Operational Procedures</u>	4-1
a. General	
b. Description of any Warning System in Effect	
4.2 <u>Maintenance Procedures</u>	4-1
a. General	
b. Operating Facilities	
4.3 <u>Evaluation</u>	4-1
5. EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES	
5.1 <u>General</u>	5-1
5.2 <u>Design Data</u>	5-1
5.3 <u>Experience Data</u>	5-1
5.4 <u>Test Flood Analysis</u>	5-1
5.5 <u>Dam Failure Analysis</u>	5-2

SECTION

PAGE NO.

6.	EVALUATION OF STRUCTURAL STABILITY	
6.1	<u>Visual Observation</u>	6-1
6.2	<u>Design & Construction Data</u>	6-2
6.3	<u>Post-Construction Changes</u>	6-2
6.4	<u>Seismic Stability</u>	6-2
7.	<u>ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES</u>	
7.1	<u>Project Assessment</u>	7-1
	a. Condition	
	b. Adequacy of Information	
7.2	<u>Remedial Measures</u>	
	a. Maintenance Procedures	7-1

APPENDICES

	<u>PAGE NO.</u>
APPENDIX A: INSPECTION CHECKLISTS	A-1 to A-3
APPENDIX B: ENGINEERING DATA	
Engineering Data Checklist	B-1
Bibliography	B-2
General Plan	Sheet B-1
Profile of Natural Rock Spillway & Dam Section	Sheet B-2
APPENDIX C: DETAIL PHOTOGRAPHS	
Photo Location Plan	Sheet C-1
Photographs	C-1 to C-5
APPENDIX D: HYDROLOGIC AND HYDRAULIC COMPUTATIONS	
Drainage Area Map	Sheet D-1
Computations	D-1 to D-6
APPENDIX E: INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS	



NOTES:

1.)VIEW OF DAM LOOKING DOWNSTREAM.

2.)OVERVIEW PHOTO TAKEN DECEMBER 20,1980.

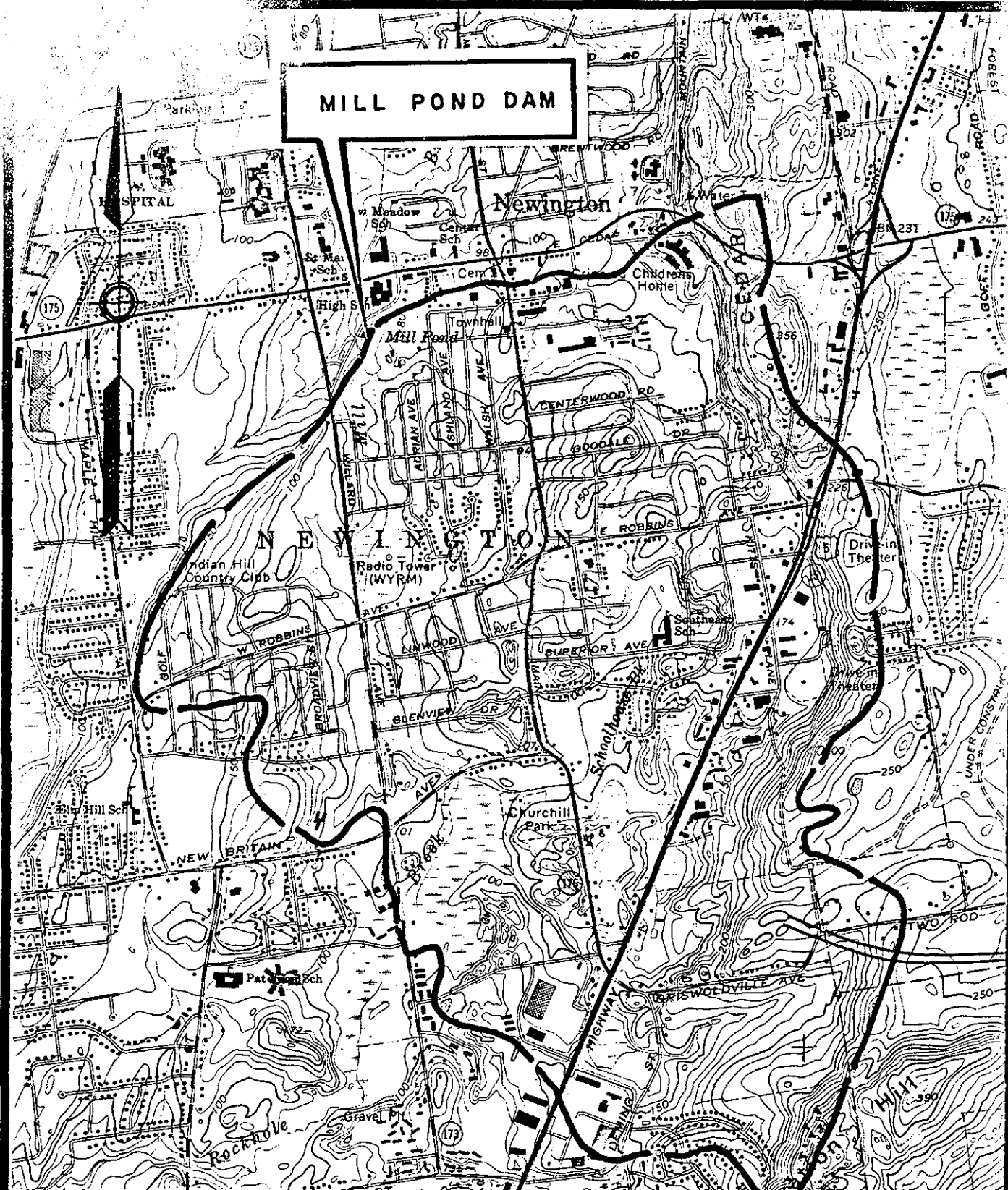
GOODKIND & O'DEA INC.-
SINGHAL ASSOCIATES(JV)
ENGINEERS

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
OVERVIEW PHOTO OF DAM

MILL POND DAM
NEWINGTON, CONNECTICUT

BY L.K.	CHECKED BY W.J.W.	APPROVED BY L.J.B.	SCALE: NONE	DATE: MAY, 1981	SHEET 1
------------	----------------------	-----------------------	-------------	-----------------	---------



GOODKIND & O'DEA INC.
SINGHAL ASSOCIATES (JV)
ENGINEERS

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
LOCATION PLAN
MILL POND DAM
NEWINGTON CONN.

DRAWN BY	CHECKED BY	APPROVED BY	SCALE: 1" = 2000'
P.O.	R.S.	R.S.	DATE: MAY, 1981 SHEET 2

REPORT

INFORMATION Section 1

1.1 GENERAL

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Goodkind & O'Dea Inc., Hamden, Conn. and Singhal Associates, Orange, Connecticut (Joint Venture) have been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Goodkind & O'Dea Inc. and Singhal Associates (J.V.) under a letter of December 9, 1980 from Colonel William E. Hodgson, Jr., Corps of Engineers. Contract No. DACW 33-81-C-0022 dated December 9, 1980 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

The purposes of the program are to:

1. Perform technical inspection and evaluation of

Federal dams to identify conditions requiring inspection in a timely manner by non-federal interest.

2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.
3. To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF PROJECT

a. Location

Mill Pond Dam is situated on Mill Brook which flows into Piper Brook, approximately 2.0 miles downstream from the dam, the latter brook flowing into South Branch Park River 1.5 miles farther down. The dam location is approximately 250 ft. south of Newington Town Hall, adjacent to Mill Street. The geographic location of the site may be found on the Hartford South Quadrangle Map, with coordinates of latitude $N41^{\circ} 41.6'$ and longitude $W72^{\circ} 43.8'$.

b. Description of Dam and Appurtenant Structures

Mill Pond is impounded by a dam consisting of irregular natural rock formation, approximately 600 ft. long, with a maximum height of 19 ft. Overlying the rock is a shallow depth of earth along the crest and upstream slope. A 4 ft. wide processed stone walk along the crest varies from 10 to 20 ft. in width.

The average upstream and downstream slopes are approximately 3 horizontal to 1 vertical and 2 horizontal to 3 vertical respectively. Crest elevations of the dam vary from approximately 74 to 78 ft.

(Note: All elevations in the report are referenced to NGVD.)

The spillway section has a width of approximately 35 ft. and is overpassed by a 5 ft. wide, 40 ft. long footbridge. With a crest elevation of 71.2 ft. the spillway is 3.1 ft. below the minimum dam crest elevation. The processed stone walk is connected to the recreation area on the bank of the raceway channel by a flight of stairs in the dam slope. A concrete retaining wall has been built along the Mill Brook in the patio area. (See plans and photographs in Appendices B and C.)

c. Size Classification - 'Small'

According to the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, a dam is classified 'small' if either the height is between 25 and 40 ft., or the storage is between 50 and 1,000 ac. ft., or both. The Mill Pond Dam has a maximum height of 19 ft. and a maximum storage of 52 ac. ft. As such, the dam is classified as 'small' in size.

d. Hazard Classification - 'low'

Based on the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the hazard classification for the dam is 'low'. The dam consists of a natural rock formation with only a shallow earth cover. Considering the composition of the dam, it is unlikely that the rock core would fail. The earth cover, if eroded, would not result in substantial downstream flooding.

e. Ownership

The Mill Pond Dam is owned by

The Town of Newington
131 Cedar Street
Newington, Connecticut 06111
Telephone: (203) 666-4661

f. Operator

Mr. Robert Stanley
Director, Parks and Recreation Department
Town of Newington
131 Cedar Street
Newington, Connecticut 06111
Telephone: (203) 666-4661

g. Purpose of Dam

The dam is used for recreational purposes.

h. Design and Construction History

Mill Pond Dam is a natural rock formation and has no available design or construction data. The only evidence of any dam construction is at the north end of the dam which may have been partially filled in with earth. Since 1677 several types of mills, including a sawmill, gristmill, and cidermill have utilized the Mill Pond for their source of power. In the early 1900's, a paperboard company supposedly put in a 48-inch iron pipe through the north end of the dam embankment which supplied water for a boiler and turbine located downstream of the dam. (learned through unconfirmed conversation with a local resident.) Mill Pond Dam was eventually used for recreational purposes in the 1930's and has been part of Mill Pond Park since the 1940's.

In 1978, a new footbridge over the spillway and a patio area just downstream of the dam were constructed in the park.

i. Normal Operation Procedures

There are no operational procedures for Mill Pond Dam.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area consists of 3.36 sq. mi. of flat terrain with average slope of 1%. Elevations in the basin range from about 75 to 360 ft. (NGVD). Most of the area is developed and includes portions of several town roads, State Routes 15, 173, 175 and 176.

b. Discharge at Damsite

The spillway is a natural irregular rock formation 35 ft. wide located near the south end of the dam.

- | | |
|--|---------|
| 1. Outlet works: | None |
| 2. Maximum known flood at damsite: | Unknown |
| 3. Ungated spillway capacity at top of dam
elevation 74.3': | 575 cfs |
| 4. Ungated spillway capacity at test
flood elevation 74.6': | 990 cfs |
| 5. Gated spillway capacity at normal
pool elevation: | N/A |
| 6. Gated spillway capacity at test
flood elevation: | N/A |

7. Total spillway capacity at test flood elevation 74.6':	990 cfs
8. Total project discharge at top of dam elevation 74.3':	575 cfs
9. Total project discharge at test flood elevation 74.6':	990 cfs

c. Elevation - Feet above NGVD

1. Streambed at toe of dam:	55.3
2. Bottom of cutoff:	N/A
3. Maximum tailwater:	N/A
4. Normal pool:	71.2
5. Full flood control pool:	71.2
6. Spillway crest:	71.2
7. Design surcharge (original design)	N/A
8. Top of dam:	Varies from 74.3 to 78.0
9. Test flood surcharge:	74.6

d. Reservoir Length in Feet

1. Normal pool:	740
2. Flood control pool:	740
3. Spillway crest pool:	740
4. Top of dam:	750
5. Test flood pool:	1000

e. Storage (acre-feet)

1. Normal pool:	42
2. Flood control pool:	42
3. Spillway crest pool:	42

4.	Top of dam:	52
5.	Test flood pool:	56
f.	<u>Reservoir Surface (acres)</u>	
1.	Normal pool:	3.0
2.	Flood control pool:	3.0
3.	Spillway crest pool:	3.0
4.	Top of dam:	3.4
5.	Test flood pool:	5.1
g.	<u>Dam</u>	
1.	Type:	Natural rock formation
2.	Length:	600 ft. (approximately)
3.	Height:	19 ft.
4.	Top width:	10 ft. to 20 ft.
5.	Side slopes:	U/S: 3 horizontal to 1 vertical (varies)
		D/S: 2 horizontal to 3 vertical (varies)
6.	Zoning:	N/A
7.	Impervious core:	N/A
8.	Cutoff:	N/A
9.	Grout curtain:	N/A
10.	Other	-
h.	<u>Diversion and Regulating Tunnel</u>	N/A

i. Spillway

- | | |
|------------------------|--|
| 1. Type: | Overflow weir spillway
(natural rock formation) |
| 2. Length of crest: | 35 ft. |
| 3. Crest elevation: | 71.2 |
| 4. Gates: | N/A |
| 5. Upstream channel: | N/A |
| 6. Downstream channel: | Natural Channel |
| 7. General | N/A |

j. Regulating outlets

None

ENGINEERING DATA
Section 2

2.1 Design Data

There is no available design data for the dam or spillway which are primarily natural rock formations. The Metropolitan District Commission topographical survey maps were the only information available pertaining to the project.

2.2 Construction Data

There is no available construction data.

2.3 Operational Data

There is no available operational data.

2.4 Evaluation of Data

a. Availability

The only available engineering data are the topographical survey maps of the Mill Pond area which can be found at the Metropolitan District Commission in Hartford, Connecticut.

b. Adequacy

Available information is inadequate to be of much assistance in the evaluation of the dam performance.

c. Validity

A comparison of the available record data and visual observations reveals no significant discrepancies in the record data.

VISUAL INSPECTION
Section 3

3.1 Findings

a. General

The formal field inspection took place December 17, 1980 by engineers from Goodkind & O'Dea, Inc., and Singhal Associates. Detailed checklists, which are included in Appendix A, were utilized for the inspection of the dam and the spillway. Photographs showing the dam features and problem areas were also taken during the inspection and are given in Appendix C along with the photo location plan.

Based upon the visual inspection, the general condition of the project was good with some areas requiring maintenance work and/or monitoring. At the time of the inspection the pool level of Mill Pond was approximately 71.3 ft (NGVD) which was one-tenth of a foot above the spillway crest elevation. The light snow cover existing at the time of inspection may have obscured problems, such as erosion or seepage.

b. Dam

The dam embankment is primarily an irregular, natural rock formation with much of the rock exposed along the downstream side. Through an unsubstantiated conversation with a local resident, it was learned that the north end of the dam may partially consist of earthfill. Compared to the remainder of the dam embankment, the exposed rock along the downstream slope appeared to be at a lower elevation at the north end, which would confirm the need for earthfill.

A four foot wide processed stone walk, which is in good condition, lies along the dam crest with a five foot wide wood and steel footbridge crossing the spillway. In addition, the snow covered crest, as well as the upstream slope of the embankment, appeared to be in good condition with a well maintained growth of grass. Numerous shrubs and small trees were observed along the upstream embankment slope, with a heavy growth at the south end (See Photo 1).

The downstream slope was very steep and covered with a large number of shrubs and trees, up to 18" in diameter (See Photo 1, 2 & 3). Remnants of a brick masonry wall partially retaining earthfill were observed along the downstream dam embankment as shown in Photo 4. The wall which is located on the general dam plan in Appendix B is founded on a rock base and appears to have been part of an old building. As shown in Photo 5, a four foot wide, rockfilled depression with a bottom approximately 8 ft. below the gravel path was observed on the downstream slope. The depression, which may at one time have been a sluiceway for the old waterpowered mills, showed no sign of seepage.

A small wet area approximately 4 ft. by 5 ft. was observed at the downstream toe of the north end of the dam embankment (See general dam plan in Appendix B). As shown in Photo 6, the exposed ground at the wet area was soft; however there was no visible seepage from the dam embankment.

c. Appurtenant Structures

Spillway

The spillway, which is an irregular natural rock formation, is in good condition with no signs of loose rock or unusual wear (See Photos 7 & 8). Extending over the spillway, the wood and steel footbridge was also in good condition. There was no evidence of any cracking or spalling of the concrete footing or abutments which can be seen in Photo 8. The wooden walkway and railings and the steel supporting substructure were well painted and appeared structurally sound.

Immediately downstream from the spillway, the rocky discharge channel was generally clean with a few trees overhanging the channel (See Photo 7).

d. Reservoir Area

Located in Mill Pond Park, the reservoir area is primarily encompassed by flat, open grass fields with several large trees along the east shore. The only structure near the upstream reservoir area is the Newington Town swimming pool which is located east of the pond.

e. Downstream Channel

Consisting of a rocky bottom and grass lined slopes, the downstream channel (Mill Brook) is generally in good condition. As can be seen in Photo 9, moderate erosion was observed along the north bank of the channel immediately downstream from the spillway. Across the channel from the eroded area is the recently built concrete patio which is in good

condition as shown in Photos 7 and 9.

Approximately 240 feet downstream of the spillway, the channel flows under Mill Street through a 9'-6" x 6' concrete culvert into a flat swampy area.

3.2 Evaluation

Overall, the condition of Mill Pond Dam is good as assessed by the visual inspection of the snow covered dam and its appurtenances. As noted in Section 6, the trees and shrubs along the embankment slopes do not significantly affect the dam stability considering its rock composition; however, the tree and shrub growth in the vicinity of the rock filled depression could potentially lead to seepage problems if not removed. The wet condition noted at the toe of the dam at its north end may result in decreased structural stability.

OPERATIONAL AND MAINTENANCE PROCEDURES
Section 4

4.1 Operational Procedures

a. General

At this time, there are no operational procedures, such as dam surveillance or reservoir level readings. The spillway is a natural rock formation and, therefore, has no operational procedures.

b. Description of any Warning System in Effect

There are no warning systems in effect.

4.2 Maintenance Procedures

a. General

Mill Pond Dam is owned and maintained by the Town of Newington. The maintenance procedures generally consist of routine mowing of the grass along the upstream embankment, the dam crest, and around the pond. Located immediately upstream of the pond is a swampy area where the brush is normally cut on an annual basis by the Town.

b. Operating Facilities

There are no operating facilities which require any maintenance.

4.3 Evaluation

The maintenance procedures of Mill Pond Dam are generally good, with areas requiring improvement. Formal maintenance procedures should be developed by the Town of Newington to insure continued safety of the dam. Recommended procedures for the maintenance of the dam are given in Section 7.

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

Section 5

5.1 GENERAL

The Mill Pond Dam primarily consists of an irregular natural rock formation, approximately 600 ft. long with a maximum height of 19 ft.

The reservoir has a contributory drainage area of 3.36 square miles which is practically flat with an average slope of 1%. Most of this area is inhabited and has a large number of houses, several town roads, three State routes and a major highway.

The spillway is a 35 ft. wide natural rock formation with a maximum capacity of 575 cfs at the top of the dam. Since the spillway can pass only 58% of the 990 cfs routed test flood discharge the dam will be overtopped by approximately 4". The crest elevation of the spillway and the lowest point on the dam are 71.2' and 74.3' respectively.

5.2 Design Data

No design data is available.

5.3 Experience Data

There are no records of reservoir water levels.

5.4 Test Flood Analysis

The Mill Pond Dam is classified as being 'low' hazard potential in accordance with Table 2 on page D-9 of the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams. The test flood for the 'small' category under which this dam falls is recommended to be between 50 and 100 year flood. Assuming the

100 year flood frequency, the test flood was calculated as 1,000 cfs based on the SCS method.

The test flood was routed through the reservoir using the Corps of Engineers' short cut method, and assuming the initial water level to be at the spillway crest elevation 71.2'. Due to the small storage capacity of Mill Pond, the routed outflow was 990 cfs which is 10 cfs less than the inflow. The spillway capacity of 575 cfs is only 58% of the routed flood, and overtopping of the dam will occur under the test flood condition, by approximately 4".

5.5 Dam Failure Analysis

Dam failure analysis was not necessary since it is improbable that its rock core would fail. Scouring of the earth cover, in the case of overtopping, would not create hazardous conditions.

EVALUATION OF STRUCTURAL STABILITY
Section 6

6.1 Visual Observations

The visual inspection revealed no immediate structural stability problems at this time; however, a small wet area was noticed at the downstream toe of the north end of the dam. Although there was no seepage observed, the wet area indicates that a seepage problem may be present which could possibly decrease the structural stability of the dam. The unconfirmed information from local residents suggests that this section of the dam may be earthfill and/or contain a portion of an old 48" iron intake pipe. It is quite possible that the seepage may be a direct result of either, or both, of these factors.

The presence of large trees and shrubs along the dam embankment does not actually affect the stability of the dam, since it is primarily a natural rock formation. Removal of these trees and shrubs would not significantly increase the dam stability, nor would it be beneficial to the appearance of Mill Pond Park; however, it is recommended that the trees and shrubs in the vicinity of the rock filled depression be removed. Their root systems could penetrate the depression area, resulting in potential seepage.

A four foot wide rock filled depression was also observed on the downstream side of the dam embankment as noted in Section 3. It could not be determined from the visual inspection whether the depression was natural or man-made; however, due to the absence of any seepage, the area is not of major concern at this time.

6.2 Design and Construction Data

There is no design or construction data available; therefore, an analysis of the structural stability could not be made.

6.3 Post Construction Changes

No records of any post construction changes are available; however, as noted in Section 1 and 6, a 48" iron intake pipe was supposedly constructed through the north end of the dam embankment in the early 1900's.

6.4 Seismic Stability

The dam is located in Seismic Zone 1 and in accordance with Corps of Engineers' guidelines does not warrant further seismic analysis at this time.

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES
Section 7

7.1 Project Assessment

a. Condition

Based upon the visual inspection of the snow covered site and past performance, the dam appears to be in good condition. There was no evidence of any immediate structural instability problems; however, there are areas of concern requiring maintenance and/or monitoring as noted in Sections 7.2 and 7.3.

Based upon "Preliminary Guidance for Estimating Maximum Probable Discharge" dated March, 1978, peak inflow to the lake is 1000 cfs; peak outflow is 990 cfs, with the water level 0.3 ft. above the dam crest. Based upon our hydraulic computations, the spillway capacity with the lake level to the top of dam is 575 cfs, which is equivalent to approximately 58% of the routed test flood outflow.

b. Adequacy of Information

The information available is such that an assessment of the condition and stability of the dam had to be based upon the visual inspection.

7.2 Remedial Measures

a. Maintenance Procedures

The following measures should be undertaken and continued on a regular basis:

1. Institute a formal program of maintenance procedures and fully document it to provide accurate records for future reference.
2. Remove trees and shrubs and their root systems in the vicinity of the rock filled depression.
3. Repair eroded area along the north slope of the downstream channel.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Mill Pond Dam

DATE 12 / 17 / 20

TIME Afternoon

WEATHER Clear - Cold 20's
2 to 3" of light snow
W.S. ELEV. U.S. D.N.S.

PARTY:

1. Ramesh Singhal (RS)
2. Ed Henderson (EH)
3. Wesley J Wolf (WW)
4. Gerald Buckley (GB)
5.

DISCIPLINE:

- Hydraulics
- Geotechnical
- Hydraulics
- Soils & Structures
-

PROJECT FEATURE

INSPECTED BY

1. Dam Embankment

RS, EH, WW, GB

2. Spillway (Natural Rock)

RS, EH, WW, GB

3.

4.

5.

6.

7.

8.

9.

10.

PERIODIC INSPECTION CHECK LIST

PROJECT Mill Pond Dam
 PROJECT FEATURE Dam Embankment
 DISCIPLINE _____

DATE 12/17/80
 NAME EH, AS, WW, GE
 NAME _____

AREA ELEVATED	CONDITIONS
<u>DAM EMBANKMENT</u>	Irregular Natural Rock Formation <small>(earth covered)</small>
Crest Elevation	Varies from 74.01 To 78.01 (NGVD)
Current Pool Elevation	71.31 (NGVD)
Maximum Impoundment to Date	Unknown
Surface Cracks	None Observed*
Pavement Conditions	Good (Processed Stone Walkway)
Movement or settlement of crest	None Observed*
Lateral movement	None Observed
Vertical alignment	O.K.*
Horizontal alignment	O.K.
Conditions at abutment & at Concrete Structures	N/A
Indications of Movement of Structural Items on Slopes	N/A
Trespassing on Slopes	Pedestrian; No evidence of damage*
Sloughing or Erosion of Slopes or Abutments	None Observed*
Rock Slope Protection-Riprap Failures	N/A
Unusual Movement or Cracking at or Near Toes	None Observed*
Unusual Embankment or Downstream Seepage	Seepage - North End of Dam
Piping or Boils	None Observed
Foundation Drainage Features	N/A
Toe Drains	N/A
Instrumentation System	N/A

A-2 *Note: Two To Three inches
 of earth cover during inspection

PERIODIC INSPECTION CHECK LIST

PROJECT Mill Pond Dam DATE 12/17/87
 PROJECT FEATURE Natural Rock Spillway NAME EH, RS, W/W, GB
 DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	Pond behind Dam - No Channel
General Condition	Good
Loose rock overhanging channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Rock - Good
b. Weir and trailing walls	Natural Rock Formation: Footbridge over Spillway
General Condition of Concrete	N/A
Rust or Staining	
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	
Drain Holes	
c. Discharge Channel	Natural Channel
General Condition	Good - Some Erosion
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Few
Floor of Channel	Rocky - O.K.
Other Obstructions	Bridge at Mill St. 250' Downstream from Spillway

APPENDIX B

ENGINEERING DATA

ENGINEERING DATA CHECKLIST

<u>ITEM</u>	<u>AVAILABILITY</u>	<u>LOCATION</u>
LOCATION MAP	Available	Metropolitan District Commission Map, Hartford, CT.
AS-BUILT DRAWINGS	Not Available	
HYDROLOGIC & HYDRAULIC DATA	Not Available	
SOIL BORINGS	Not Available	
SOIL TESTING	Not Available	
GEOLOGY REPORTS	Not Available	
CONSTRUCTION HISTORY	Not Available	
OPERATION RECORDS	Not Available	
INSPECTION HISTORY	Not Available	
DESIGN REPORT	Not Available	
DESIGN COMPUTATIONS	Not Available	
HYDROLOGIC & HYDRAULIC	Not Available	
DAM STABILITY	Not Available	
SEEPAGE ANALYSIS	Not Available	

BIBLIOGRAPHY

1. "Recommended Guildelines for Safety Inspection of Dams", Department of the Army, Office of the Chief Engineers, Washington, D.C. 20314, 1979.
2. Design of Small Dams, Revised Reprint, United States Department of the Interior, Bureau of Reclamation, United States Government Printing Office, Washington, D.C.
3. Soil Survey, Hartford County, Connecticut, United States Department of Agriculture, U.S. Government Printing Office, Washington 25, D.C. 1962
4. Donald M. Gray: Handbook on the Principles of Hydrology, Water Information Center, 1970.
5. Hunter Rouse: Engineering Hydraulics, John Wiley and Sons, New York, 1950.
6. Victor L. Streeter: Fluid Mechanics, McGraw-Hill Book Company, Inc. 1958.
7. S.C.S. National Engineering Handbook, Hydrology Section 4, Soil Conservation Service, U.S. Department of Agriculture, 1972.

APPENDIX C

DETAIL PHOTOGRAPHS

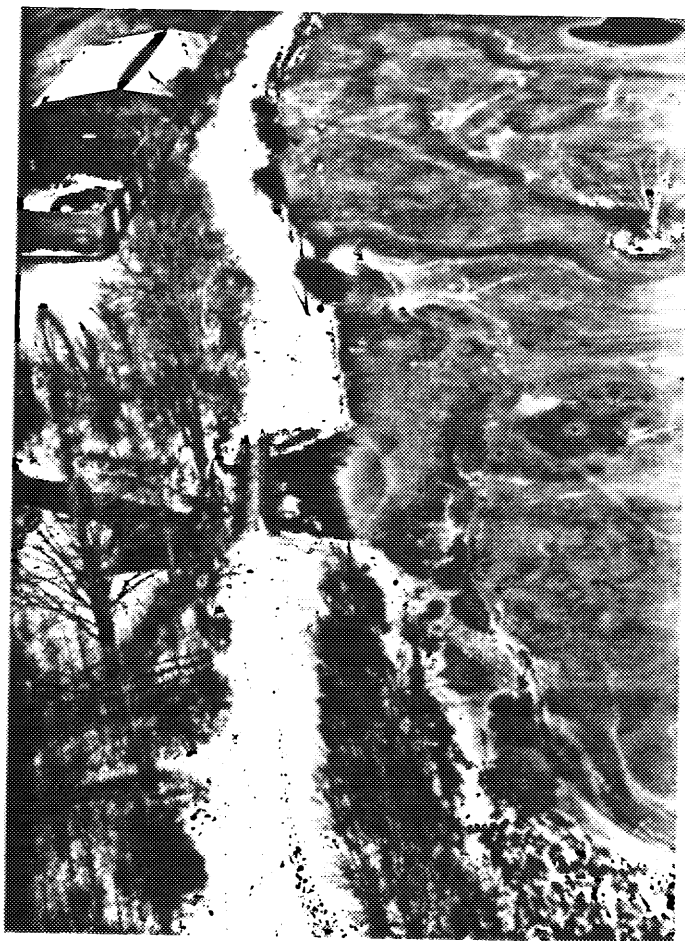


Photo 1 - View looking north along the
top of dam.

Note:
Photo taken December 20, 1980



Photo 2 - View looking south along crest of dam.

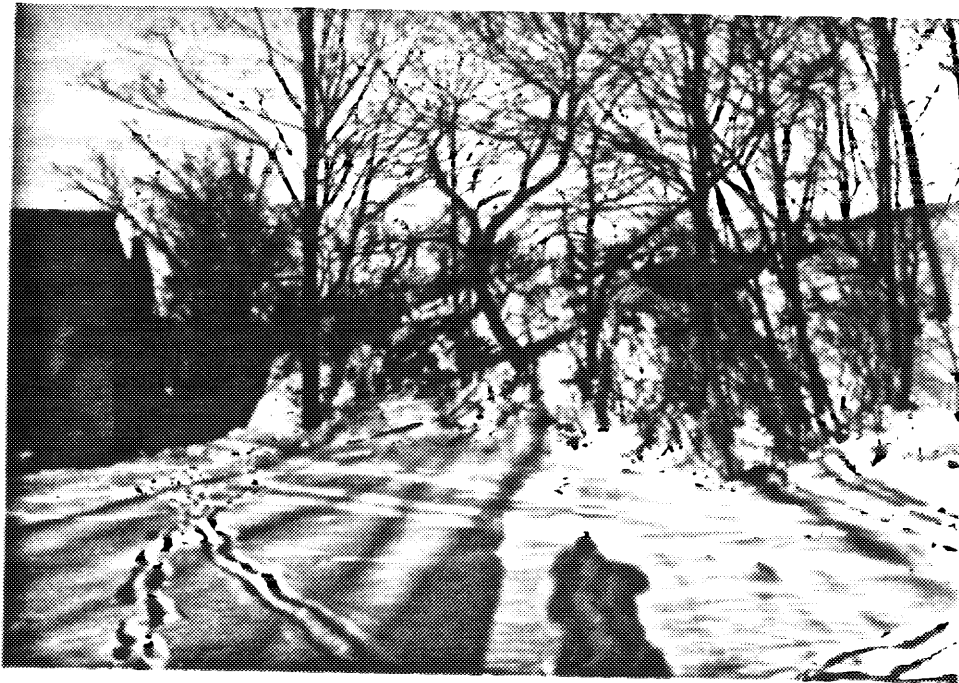


Photo 3 - View looking north along downstream side of dam showing outcrops of bedrock.

Note:
Photos taken December 17, 1980



Photo 4 - Remnant of brick masonry wall on the downstream slope.

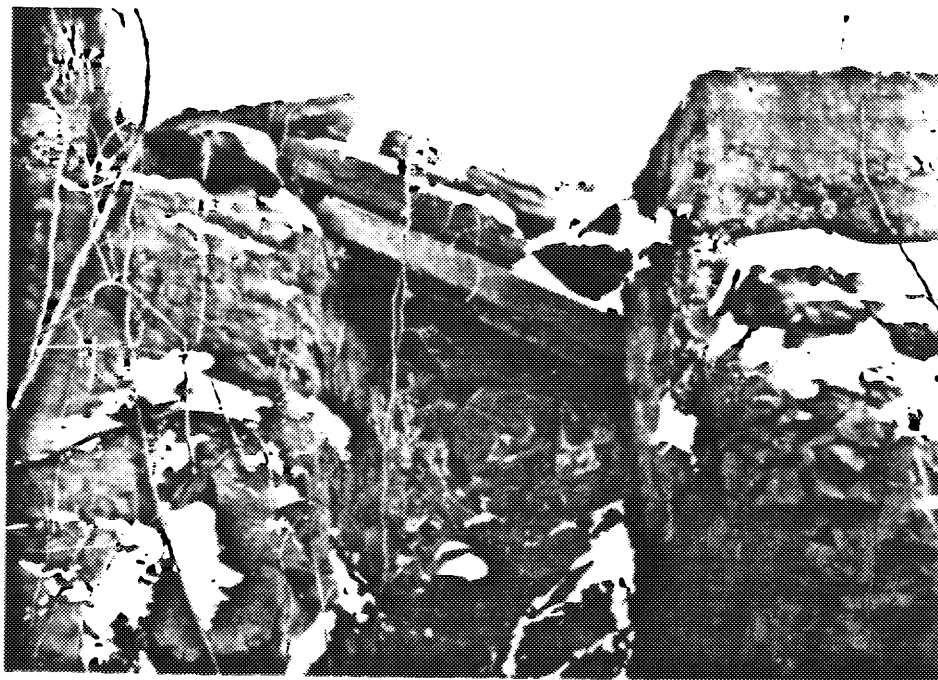


Photo 5 - View of rock filled depression from downstream side of dam embankment.

Note:

Photos taken December 17, 1980



Photo 6 - Wet area at downstream toe of dam embankment (North End).



Photo 7 - View of natural rock spillway and foot-bridge over spillway.

Note:
Photos taken December 17, 1980



Photo 8 - Spillway Crest - Natural Rock

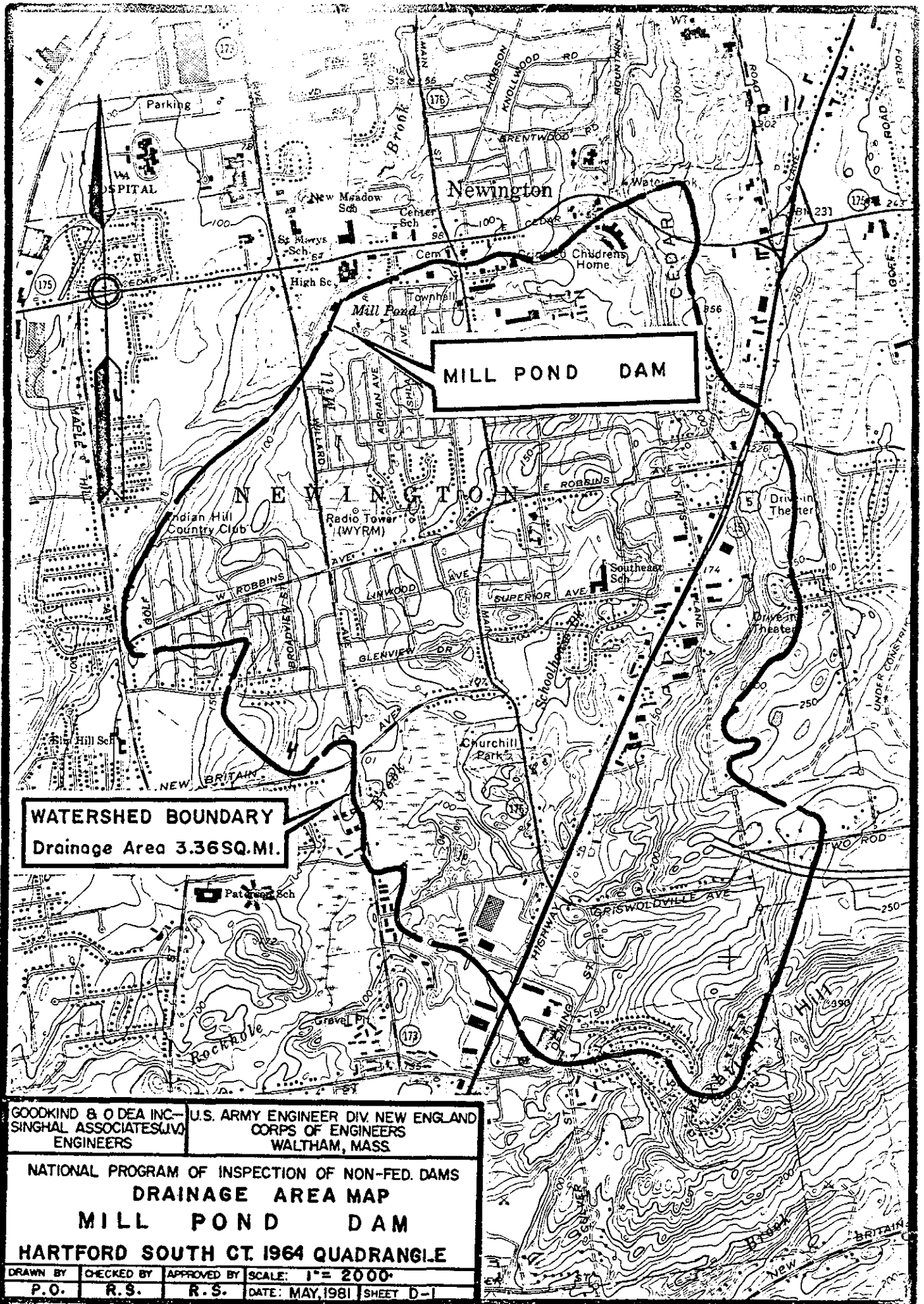


Photo 9 - Downstream Channel

Note:
Photos taken December 17, 1980

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



GOODKIND & O'DEA INC.-
SINGHAL ASSOCIATES (JV)
ENGINEERS

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
DRAINAGE AREA MAP
MILL POND DAM
HARTFORD SOUTH CT. 1964 QUADRANGLE

DRAWN BY	CHECKED BY	APPROVED BY	SCALE: 1"= 2000'
P.O.	R.S.	R.S.	DATE: MAY, 1981 SHEET D-1

SINGHAL ASSOCIATES

CONSULTING ENGINEERS

(CIVIL, HYDRAULICS, SANITARY)

827 MAPLEDALE ROAD, ORANGE, CT 06477

TEL (203) 795-6562

Job MILL POND DAM

Sheet Number D-1

Date 3.17.1981

By R.S.

TEST - FLOOD

DRAINAGE AREA = 3.36 SQ. MILES

THE TERRAIN HAS AN AVERAGE SLOPE OF 1.0%
AND CAN BE CLASSIFIED UNDER 'FLAT AND COASTAL' CATEGORY.

THE TEST FLOOD = 100-YR FREQUENCY FLOOD

= 1000 CFS

(SEE BELOW)

SIZE AND HAZARD CLASSIFICATION

MAXIMUM HEIGHT OF THE DAM = 19 FT.

MAXIMUM IMPOUNDMENT UPTO TOP OF DAM = 52 AC.FT.

AS THE STORAGE LIES BETWEEN 50 AND 1000 AC.FT.
AND HEIGHT OF THE DAM IS 19 FT. MAXIMUM, THE
SIZE OF THE DAM IS 'SMALL'.

THE HAZARD POTENTIAL IS 'LOW'. AS PER
TABLE 3, PAGES D-12, D-13 OF THE 'RECOMMENDED GUIDE
LINES FOR SAFETY INSPECTION OF DAMS', THE RECOMMEN-
DED TEST FLOOD = 50 YR. TO 100 YR. FREQUENCY FLOOD

THE 100-YR FLOOD WAS 1000 CFS AS PER
S.C.S. METHOD.

ASSUME TEST FLOOD = 1000 CFS

SINGHAL ASSOCIATES

CONSULTING ENGINEERS

(CIVIL, HYDRAULICS, SANITARY)

827 MAPLEDALE ROAD, ORANGE, CT 06477

TEL: (203) 795-6562

Project: DAM
Number: 13
Date: 2-17-1981
By: R.S.

SPILLWAY CAPACITIES

THE SPILLWAY CONSISTS OF THE FOLLOWING:
1- NATURAL ROCK SPILLWAY, 30 FT. WIDE (UNDER
THE FOOTBRIDGE, WITH CREST ELEV. 71-2

CAPACITIES AT VARIOUS ELEVATIONS ARE
TABULATED BELOW:

UPTO TOP OF DAM

ELEVATION	SPILLWAY CAPACITY (CFS) $Q = 3.0 LH^{3/2}$ (L=35')
71-2	0
71-5	17
72-0	75
72-5	156
73-0	254
73-5	366
74-0	490
74-3	575

AFTER OVERTOPPING

ELEVATION	OVER SPILLWAY $3/2$ $Q = 3 \times 35 \times H^{3/2}$	OVER DAM $3/2$ $Q = 3 \times 650 \times H^{3/2}$	TOTAL Q CFS.
74-4	600	60	660
74-6	660	320	980
74-8	720	690	1410
75-0	780	1140	1920

SINGHAL ASSOCIATES

CONSULTING ENGINEERS

(CIVIL, HYDRAULICS, SANITARY)

827 MAPLEDALE ROAD, ORANGE, CT 06477

TEL: (203) 795-6562

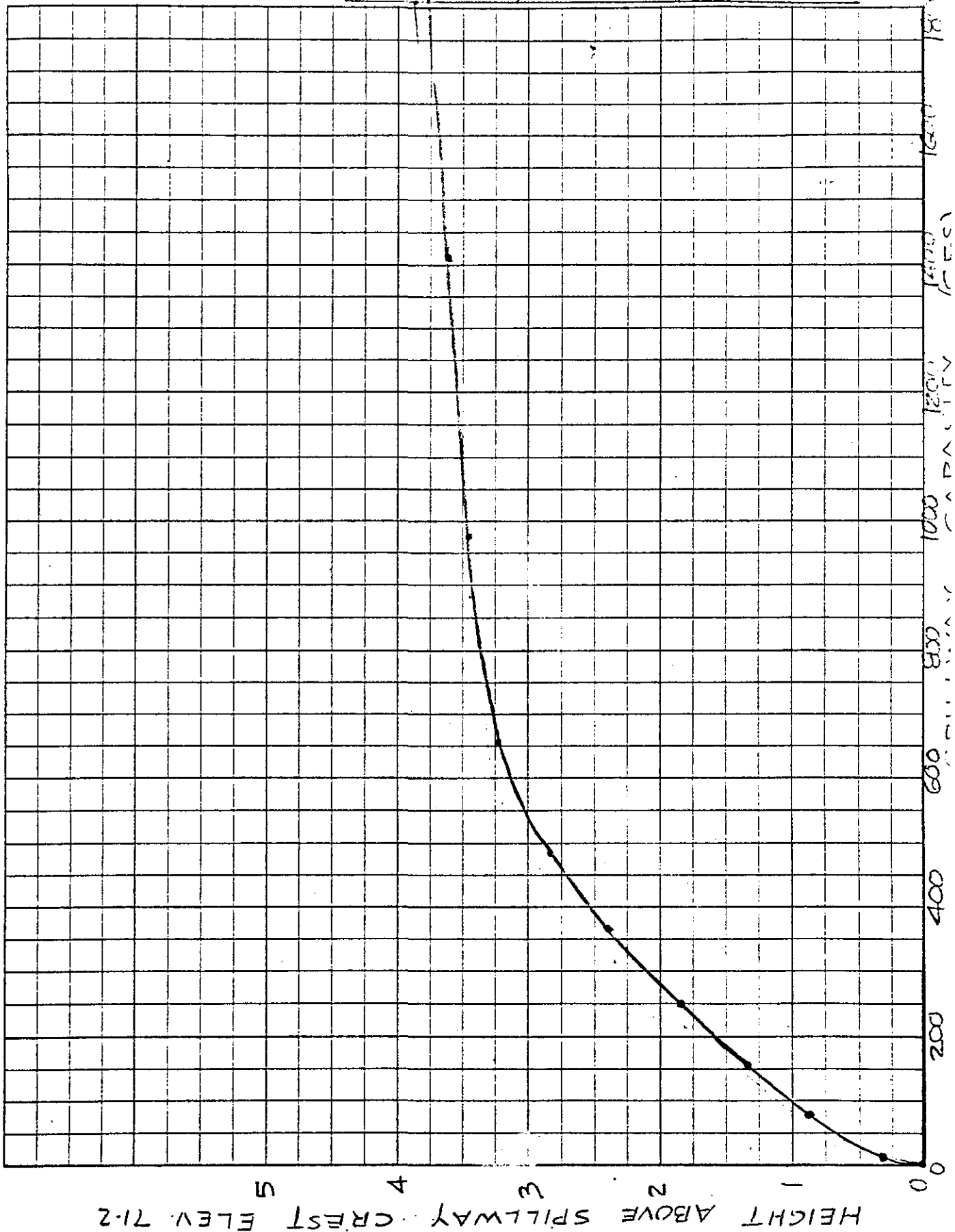
Job MILL POND DAM

Sheet Number D-3

Date 3-17-1981

By R.S.

SPILLWAY CAPACITY CURVE



SINCE & SONS
CONSULTING ENGINEERS
(CIVIL, HYDRAULICS, SURVEYING)

827 MAPLEDALE ROAD, ORANGE, N.J. 07067
TEL: (203) 795-6500

Job MILL POND DAM
Sheet Number D-4
Date 3.17.1981
By R.S.

SURCHARGE STORAGES
AND
WATER SURFACE AREAS

UPTO TOP OF DAM

RESERVOIR WATER SURFACE ELEVATION	HEIGHT ABOVE EMERGENCY SPILLWAY CREST (FT)	WATER SURFACE AREA (ACRES)	SURCHARGE STORAGE CAPACITY (AC-FT)
71.2	0.0	3.00	0.00
71.5	0.3	3.04	0.91
72.0	0.8	3.10	2.44
72.5	1.3	3.17	3.99
73.0	1.8	3.23	5.59
73.5	2.3	3.30	7.23
74.0	2.8	3.36	8.90
74.3	3.1	3.40	9.91

AFTER OVERTOPPING

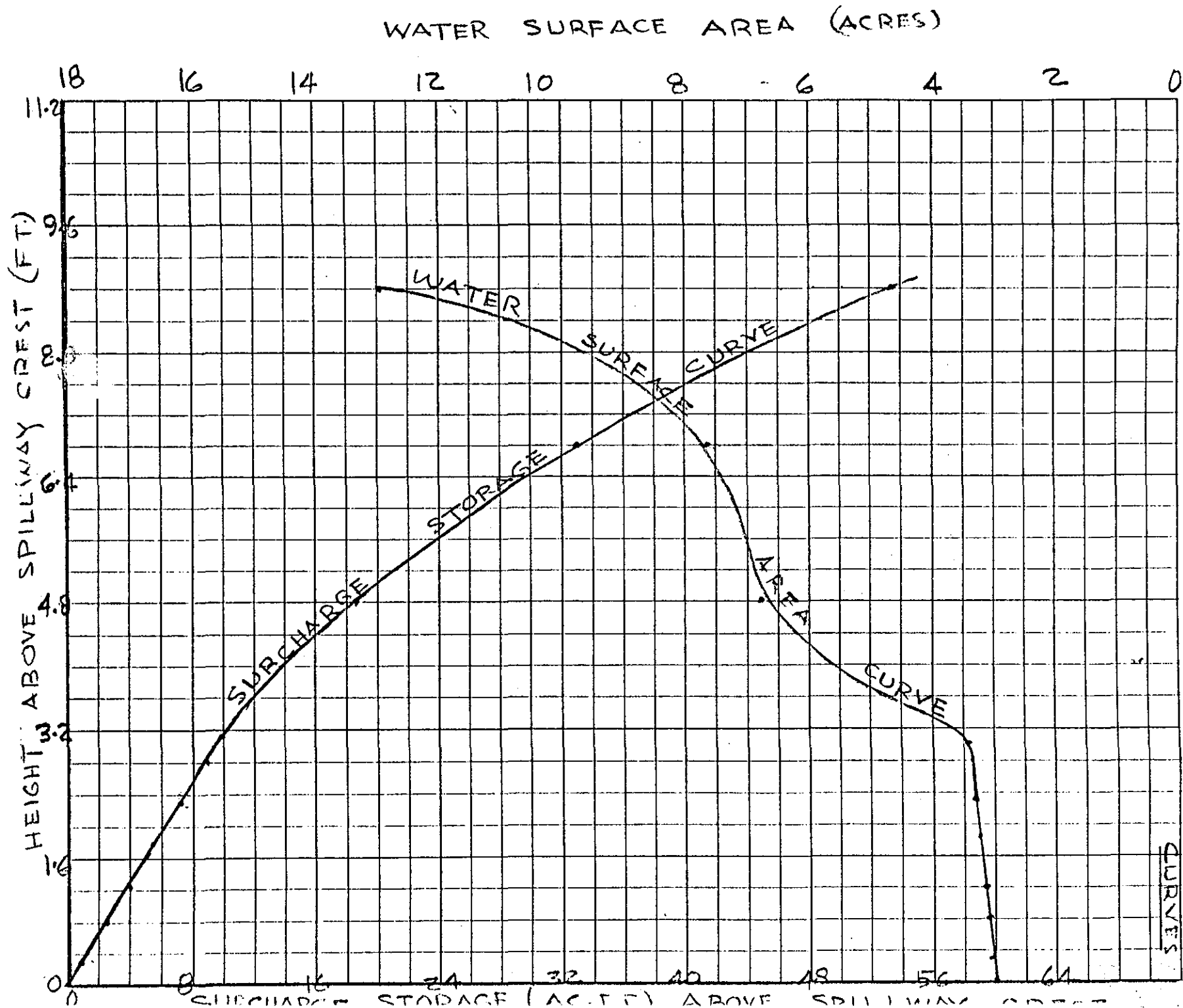
76.0	4.8	6.80	18.58
78.0	6.8	7.60	33.00
80.0	8.8	13.00	53.60

SINGHAL ASSOCIATES
CONSULTING ENGINEERS
 (CIVIL, HYDRAULICS, SANITARY)

827 MAPLEDALE ROAD, ORANGE, CT 06477
 TEL: (203) 795-6562

Job MILL POND DAM
 Sheet Number D-5
 Date 3-16-1961
 By R.S.

SURCHARGE STORAGE & SURFACE AREA CURVES



SINGHAL ASSOCIATES**CONSULTING ENGINEERS**

(CIVIL, HYDRAULICS, SANITARY)

827 MAPLEDALE ROAD, ORANGE, CT 06477

TEL: (203) 795-6562

Job MILL POND D1Sheet Number D-6Date 3.21.1981By R.SINFLOW, ROUTED OUTFLOW & ADEQUACY OF SPILLWAY CAPACITY

TEST FLOOD = 1000 CFS

FULL SPILLWAY CAPACITY UPTO TOP OF DAM = 490.0 CFS
 THIS IS INADEQUATE AND THE DAM WILL BE OVERTOPPED
 REFERRING TO THE 'SPILLWAY CAPACITY TABLE' ON
 PAGE D-2, THIS FLOW CORRESPONDS TO AN ELEVATION
 OF APPROXIMATELY 74.6 WHICH IS 3.5" ABOVE THE
 TOP OF THE DAM AND A 650 FT LENGTH OF DAM
 IS TAKING PART IN THE OVERFLOW PROCESS
 (NOT TAKING AT THIS POINT, THE EFFECT OF SURCHARGE
 STORAGE).

EFFECT OF SURCHARGE STORAGE
ON PEAK OUTFLOW

FOR $Q_{p1} = 1000$ CFS. HEIGHT ABOVE CREST OF SPILLWAY
 $= 3.4$ FT.
 \therefore SURCHARGE STORAGE = 11.5 AC-FT.
 $= \frac{11.5 \times 12}{3.36 \times 640} = 0.07$

$$Q_{p2} = Q_{p1} \left(1 - \frac{0.07}{8}\right)$$

$$= 1000 \times 0.99 = 990 \text{ CFS.}$$

THE STORAGE AVAILABLE IS VERY SMALL
 AND THE OUTFLOW IS ALMOST EQUAL TO THE
 INFLOW.

THE DAM WILL BE OVERTOPPED BY

$$\text{APPROXIMATELY } 74.6 - 74.3 = 0.3'$$

$$= 3.5" \text{ (APPROX).}$$

THE SPILLWAY CAPACITY OF 575 CFS (MAXIMUM)
 IS 58% OF THE ROUTED TEST FLOOD.

APPENDIX E

INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS

